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The Veterinary Record

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Fracture of the Navicular Bone in the Horse

BY

L. C. VAUGHAN

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North Mimms, Nr. Hatfield

FRACTURE of the navicular bone has been recorded in most types of horse; heavy draught, hunter, and pony (Wilson, 1882; Carter, 1890; Bérrar, 1913; Schmal, 1937; Schleiter & Dietz, 1957; Freudenberg, 1959). It is predominantly a front limb injury although it has been known to occur in the hind leg. There does not appear to be any particular age incidence. It is difficult to estimate accurately the relative incidence of the fracture in horses but judged from reports in the literature as well as personal observation it would appear to be an uncommon injury. Out of approximately 1,000 horses admitted to a surgical clinic over a period of 2 years, Freudenberg (1959) found 6 with navicular fracture. The present author's cases, which are described below, were seen in a period of 5 years out of about 150 horses hospitalised for the investigation of various forms of lameness.

Case 1

Pony gelding, 4 years old

The pony was found in its paddock one morning acutely lame in the left fore leg, having been turned out sound the previous evening after an afternoon's light exercise. The paddock was situated adjacent to a main-line railway track and it was thought the pony had been frightened into a frenzied gallop by a passing train.

At first, on the assumption that the injury was in the shoulder region, the pony had been rested in a loose-box for 3 weeks and then turned out to grass. When the lameness had not abated after 6 weeks it was referred to the College for investigation. At this time there was pronounced lameness even at the walk. No abnormality could be detected by palpation and manipulation of the limb but there was pain on percussion at the posterior region of the hoof. When the posterior digital nerves had been desensitised the pony trotted sound. A simple, vertical fracture of the navicular bone situated approximately 15 mm. from its medial extremity was demonstrated radiographically (Fig. 1).

For a further 2 months the pony was restricted to the confines of a loose-box, but the severity of the lameness remained unchanged. X-ray examination at the end of this time showed a complete absence of callus and non-union. Recovery now seemed unlikely and the pony was destroyed, 3½ months after the initial injury.

Case 2

Pony colt, 3 years old

The pony was bought in Ireland with a veterinary certificate of soundness and was only found to be lame on arrival at the purchaser's premises in this country. It was not needed for work immediately and so, as the lameness did not appear to be particularly troublesome, the pony was turned out. Advice was sought 6 weeks later because the pony was still lame.

At the trot the pony was markedly lame in the left fore leg but it stepped short with both front limbs and showed discomfort when turned in a tight circle to the left or right. The front limbs were free of any palpable defect but percussion at the heels of each hoof caused the animal to flinch. Once the left fore hoof had been desensitised by means of nerve block, lameness was exhibited in the opposite limb. When the foot of the latter in turn was blocked the animal moved sound. On X-ray examination the navicular bone in each fore limb was found to be fractured.

The fracture in the left was oblique and situated approximately 10 mm. from the lateral extremity. The right bone was fractured in 2 places, each line being oblique and situated 15 mm. from the extremity (Fig. 2).

Despite being confined to a loose-box for the next 5 months the pony remained acutely lame and was ultimately destroyed, 6½ months after the onset of lameness.

Case 3

Pony mare, 4 years old

While the pony was on a riding instruction course

it suddenly became lame in its right fore leg. At first the lameness was very severe but gradually it diminished and the pony was turned out. No further improvement, however, had occurred after 6 weeks rest and the animal was now referred for investigation.

At the trot the pony was acutely lame. No abnormality could be detected on palpation of the limb. There was a marked elevation of the hoof temperature and the animal flinched on percussion at the heels.

After a bilateral plantar nerve block at the level of the fetlock joint the pony trotted sound. X-rays revealed a simple vertical fracture of the navicular bone just lateral to the navicular ridge (Fig. 3).

The pony was destroyed 2 months after onset of the lameness.

Discussion

It would appear from the literature that the most common type of navicular fracture is a simple, vertical or slightly oblique fissure in the sagittal plane; a view that has been supported by the present work. In most instances the fracture occurs a short distance lateral or medial to the navicular ridge. As a rule there is no displacement of the fragments in a dorsoventral direction but it is not unusual for there to be a slight separation at the fracture line (Fig. 1). Less frequently the fracture is comminuted and in these cases there may be some dorsal or ventral displacement of the fragments (Freudenberg, 1959).

It is generally considered that severe trauma is the primary aetiological factor but more often than not the precise nature of the injury is unknown and is merely assumed from circumstantial evidence. Freudenberg (1959) was more fortunate than most reporters in obtaining a definite history in 3 of his 6 cases: 2 had caught the hoof in a railway line, and 1 had stumbled in a pot-hole. In the case of the simple vertical or oblique fracture the bone appears as though it has snapped at its weakest point, *i.e.* 10 to 15 mm. from the extremity. The way, however, in which the force needed to produce the fracture is actually transmitted to the bone remains a matter for conjecture. A study of the position the bone occupies and the way in which it is supported merits consideration. It is clear from dissection that the extremities of the bone are the most securely and rigidly fixed parts, by virtue of very strong suspensory navicular ligaments which are attached superiorly to the distal end of the first phalanx. The centre of the bone proximally has a relatively weak fascial attachment to the deep digital flexor tendon, but the distal navicular ligament connecting the distal edge to the flexor surface of the pedal bone is quite strong. Posteriorly the bone is not firmly supported by the deep digital flexor tendon, which in turn receives no rigid support on its posterior aspect from the spongy plantar cushion.

With these anatomical facts in mind it seems reasonable to suppose that during a sudden, violent pressure on the bone exerted perhaps *via* the second phalanx the body of the bone would potentially have a greater degree of backward displacement than its rigidly fixed extremities. This could produce sufficient leverage to cause fracture at the recognised sites, which are the weakest parts of the normal bone.

Smythe (1959) has contended that the fracture is the result of pressure from the deep digital flexor tendon, and he draws attention to the fact that the bone is not infrequently the focus of a rarefaction which would presumably predispose to the injury. This latter viewpoint cannot be considered seriously as far as the 3 animals described here are concerned. No evidence of concurrent bone disease was found on examination of the fractured bones and the age of the horses was well below that at which navicular disease generally occurs.

The fracture produces an acute protracted lameness which can be alleviated temporarily by desensitising the posterior digital nerves to the foot. Percussion at the heels causes the animal to flinch. The diagnosis, however, is ultimately dependent on radiographic examination.

The fate of the 3 horses with navicular fracture described in this communication lends support to the generally held view that the prognosis is extremely grave. Lameness was still acute after they had been rested 3½, 6½, and 2 months respectively. *Post-mortem* examination revealed closely similar features in each. Apart from a hairline fissure in the articular surface of the navicular bone the corono-pedal-navicular joint was otherwise unaffected (Figs. 4, 5). Only in Case 1 was there an adhesion between the posterior fibrocartilaginous surface of the bone and the adjacent deep digital flexor tendon and that was limited to the fracture. In the other 2 cases the posterior surface of the bone was unmarked and synovial fluid escaped when the navicular bursa was incised.

Examination of the isolated bones confirmed the absence of bony union and although the fragments were quite firmly connected to the body of the bone by fibrous tissue a great deal of hinge-like movement was possible. Radiographically each fracture displayed the changes that are regarded as typical of delayed union (Watson-Jones, 1957). These include absence of bony callus, bone resorption and irregularity at the fracture line, increasing the gap between the fracture components (Figs. 6, 7, 8).

It is generally accepted that the major factor contributing to the non-union of any fracture is inadequate immobilisation. Not only does excessive mobility prevent the formation of bony callus but it also results in a hyperaemia of bone which leads to the type of resorption that has been demonstrated above. The repair of a fracture may also be slow when there has been an impairment of blood supply to a fragment (Watson-Jones, 1957). In order to investigate the blood supply in navicular fracture the arterial blood supply to the bone from Case 3 was demonstrated radiographically after injecting the vessels with a radio-opaque material (Fig. 9). When compared with a similarly injected normal bone (Fig. 10) the blood supply of the entire substance of the fractured bone was found to have markedly increased. It is considered unlikely, therefore, that non-union in this case at any rate could be attributed to an interference of the blood supply of the bone.

L. C. VAUGHAN—FRACTURE OF THE NAVICULAR BONE IN THE HORSE

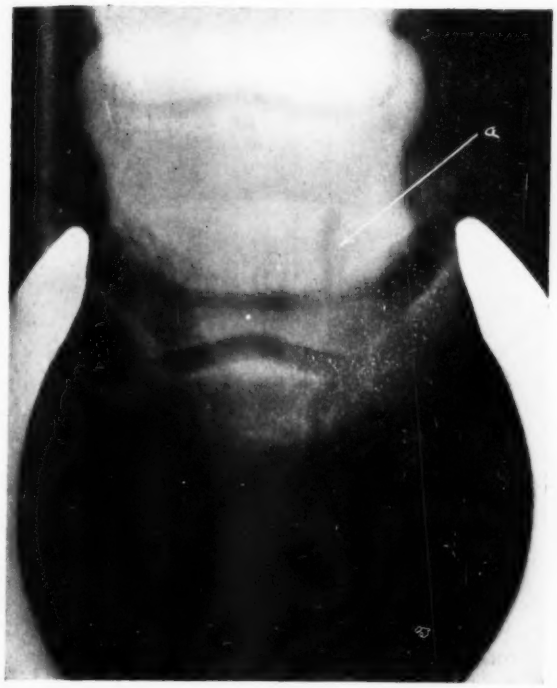

FIG. 1.—Radiograph of the left fore foot of Case 1. (a = fracture line.)

FIG. 3.—Radiograph of the right fore foot of Case 3.

FIG. 2.—Radiograph of the right fore foot of Case 2.

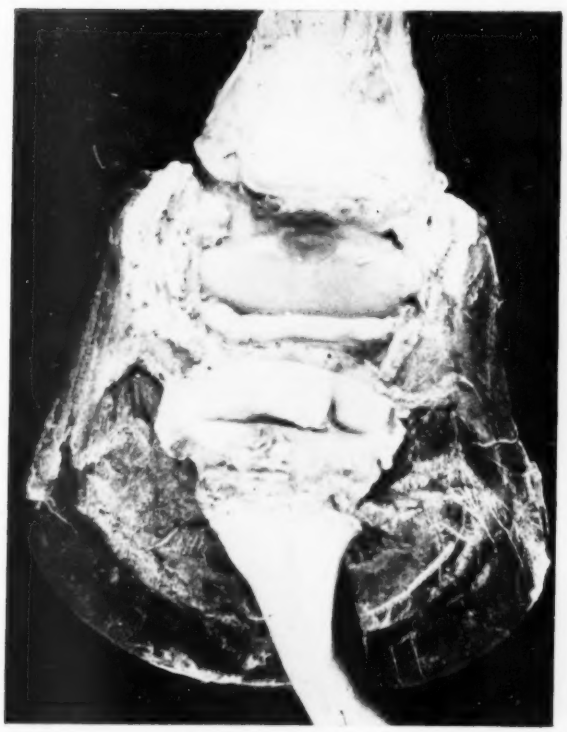

FIG. 4.—Dissection of the left fore foot of Case 1, showing the articular surface of the navicular bone.

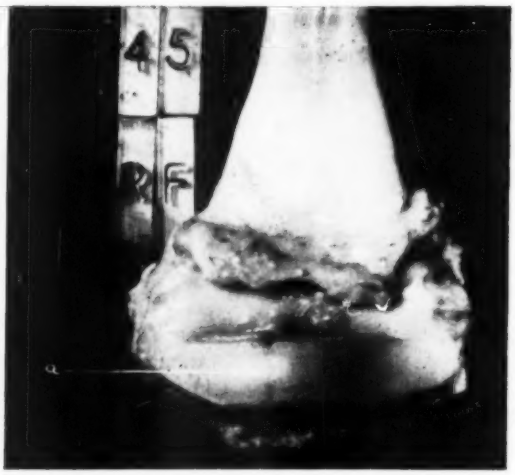

FIG. 5.—The articular surface of the fractured navicular bone from Case 3.

FIG. 6.—Radiograph of the fractured navicular bone from Case 1.

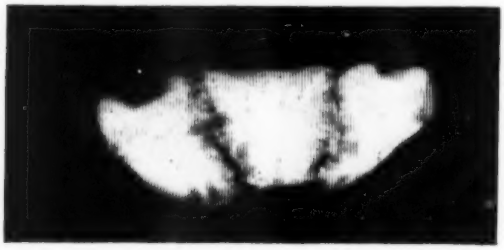

FIG. 7.—Radiograph of the fractured right navicular bone from Case 2.

FIG. 8.—Radiograph of the fractured left navicular bone from Case 2.

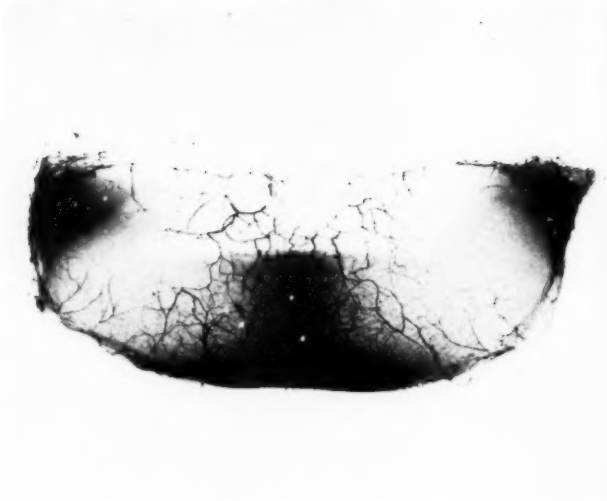

FIG. 9.—Fine-grain radiograph (enlarged) of a normal navicular bone injected to demonstrate the arterial blood supply.

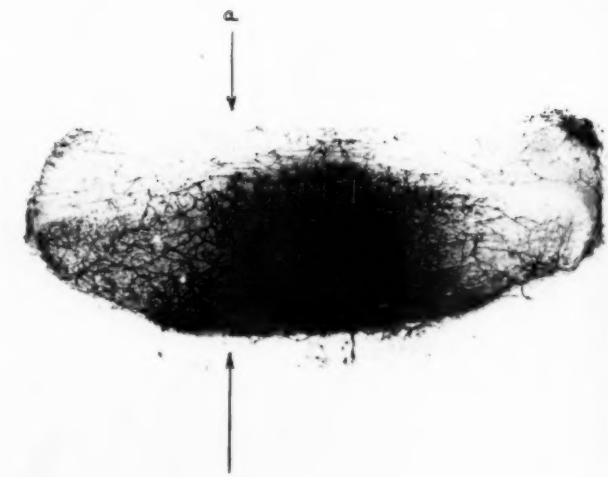

FIG. 10.—Fine-grain radiograph (enlarged) of the fractured navicular bone from Case 3, injected as in Fig. 9. The bone is decalcified and so the fracture line (a = its approximate level) cannot be seen.

What the eventual outcome of these fractures would have been had the horses been kept for an even longer priod is in doubt. From the *post-mortem* and X-ray findings it seems unlikely that a repair would ever have been effected in the absence of a complete immobilisation of the limbs. Freudenberg (1959) has referred to a satisfactory bony union in one of his cases after a period of rest lasting 13 months. Too little information, however, is generally available in this aspect to reach any definite conclusion about the chances of union. Without union the horse remains permanently lame but it has been shown that such an animal can be satisfactorily subjected to work following section of the volar nerves, or their posterior digital branches, to the affected foot (Schleiter & Dietz, 1957; Freudenberg, 1959).

Acknowledgments.—The author is indebted to Professor C. Formston for advice and encouragement received while conducting this work. Thanks are also due to Professor J. Trueta and Mr. H. Crock, of the Nuffield Orthopaedic Centre, Oxford, for the fine grain radiographs of the injected bones; to Kodak Ltd. for Figs. 1, 2 3, 6, 7, 8; and to Miss J. O'Brien for Figs. 4, 5, 9, 10.

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THE REV. CYRIL CRESSWELL

The chaplain of the Queen's Chapel of the Savoy, the Rev. Cyril Cresswell, is retiring at the end of the month. Age 71, he has held the office for 28 years.

He is also resigning his post as chaplain to the Royal Victorian Order, whose official chapel is the Savoy.

The Savoy Chapel is administered by the Duchy of Lancaster, and is the only place in London where the Queen is known as the Duke of Lancaster. When the National Anthem is played there, they sing the line "Long Live Our Noble Duke."

Mr. Cresswell has been chaplain to the Royal College of Veterinary Surgeons. It is not yet known who his successor is to be.

LOST AT CONGRESS

A pair of spectacles in a case, and a pair of hogskin gloves, have been handed to the Editorial office, having been left behind by a delegate to Congress. If the owner(s) will kindly contact us this property will be forwarded.

Clinical Note

A Spastic Chick

BY

D. P. WATSON

Royal Free Hospital School of Medicine, London

ONE of a batch of white leghorn chicks was hatched with a slight leg weakness. This resulted in a throwing of the leg, giving a spastic gait. The bird had difficulty walking on the slippery floor of the incubator and was attacked by the other chicks when it lurched or fell splay-legged. The defect was thought not to be of genetical origin (the other birds being normal), but due to an upset in the temperature of the egg which had been removed from the incubator and was at room temperature for approximately two hours. This occurred one week before it was due to hatch and the hatching was delayed for 96 hours.

The chick was examined and found to be anatomically normal. The leg was capable of being placed in the correct position and there was no obvious deformity of the head of the femur or acetabulum. Further there was quite a good thrust exerted by the bird when the leg was manually bent up against the body and the toes did the normal grasping action when placed on a finger or perch; but the leg was held laterally at an angle of approximately 90° to the normal. As there was no anatomical reason for this peculiar positioning of the leg, it was thought there may have been some upset in the firing of nerve impulses with consequent upset in tone of the stance muscles.

Fine wire netting was placed as a secondary floor, to allow of maximum grip by the toes of the unaffected left leg, and a wire division put across the incubator to keep the other chicks from jostling or attacking this particular bird. It was found that the chick used this dividing wall to exercise its spastic leg and to walk about, the right leg making snatching movements at the air and then grasping this dividing wall.

The birds were fed on chick pellets (R. Scratt); the spastic one was given a solution containing 0.04 ml. riboflavin (Vitamins Ltd.) in place of drinking water. Its condition gradually improved and after three weeks there was no need to keep the dividing wall. There was no means of telling which chick had had the leg affectation, all were equally feathered and of good general appearance.

LATE DELIVERY OF "THE VETERINARY RECORD"

With the help of evidence produced by our readers, strong representations have been made to the Central Post Office about continual late delivery of copies. A letter has been received to the effect that new arrangements are to be made at the post office adjacent to our printers as from October 1st and that these should overcome the difficulties. We are most grateful to those members who have helped us in this matter.

Thermal Stability of Egg-adapted Canine Distemper Virus

BY

S. E. PIERCY

The Wellcome Research Laboratories, Beckenham, Kent

SUMMARY.—Freeze-dried egg-adapted canine distemper vaccine stored at constant temperatures of 37° C. (98.6° F.) and 32° C. (90° F.) commenced to lose potency within 2 days.

When maintained at fluctuating temperatures reaching maxima of 28° C. (82° F.) or higher, substantial loss of virus occurred within a few weeks. When the maximum temperature did not exceed 22° C. (72° F.), potency was well maintained for 2 months or longer.

At domestic refrigerator temperatures, and particularly when the freezing compartment was used, no serious loss of virus occurred after 6 months. At — 20° C., vaccine remained unaffected for at least 2 years.

SUCCESSFUL immunisation against canine distemper (C.D.) with egg-adapted vaccines depends primarily on the introduction of adequate amounts of attenuated virus into susceptible dogs. Manufacturers ensure that sufficient virus is present at the time of preparation. Some deterioration, however, is bound to occur during the period between removal from cold storage and inoculation of the dog. Generally speaking, the rate of deterioriation is inversely proportional to the temperature of exposure. Detailed information is lacking, however, and this probably accounts for the present inconsistency amongst the various commercial firms as regards their recommendations for the proper storage of egg-adapted C.D. vaccines. This article records the results of experiments designed to provide a more precise knowledge of this important point.

Materials and Methods

Virus

Most of the work was done with the Beckenham strain of Onderstepoort attenuated freeze-dried C.D. virus, either alone, or in combination with attenuated canine contagious hepatitis virus. In some experiments 2 other well-known commercial brands of egg-adapted C.D. vaccine were tested in parallel.

Titrations

The methods used have been described in a recent article (Piercy & Sellers, 1960). On each occasion the contents of 2 ampoules of dried vaccine were reconstituted to their original volumes, pooled and not less than 6 eggs inoculated with 0.05 ml. of serial tenfold dilutions. One operator carried out all the titrations observing a constant technique throughout.

Conditions of Storage

These were chosen to cover all temperature ranges likely to be encountered in both cool and warm climates. In some experiments the temperatures were kept constant. In others a daily fluctuation was deliberately arranged to simulate the usual variation between day and night temperatures under natural conditions.

Calculations

Fifty per cent. end-points in terms of EID_{50} were estimated by the method of Reed and Muench (1938) and are expressed as negative logarithm reciprocals. An EID_{50} is the smallest amount of virus that will cause specific lesions on the chorio-allantoic membranes of at least 50 per cent. of inoculated eggs.

Results

Results are recorded in Table I and Figs. 1 and 2. The salient points may briefly be mentioned.

37° *C.* (98.6° *F.*) (*constant*). Significant loss of virus was found after 48 hours. Rapid deterioration continued over the next 2 weeks.

32° *C.* (90° *F.*) (*constant*). Appreciable loss of virus had occurred by the 3rd day. After 3 weeks most of the viral activity was lost and rapid decline in titre occurred.

18° to 32° *C.* (64° *to* 90° *F.*) (*fluctuating*). No significant change was found at 8 days, but substantial deterioration was evident at 4 weeks.

18° *to* 28° *C.* (64° *to* 82° *F.*) (*fluctuating*). Considerable loss of virus activity had occurred by the 6th week.

10° *to* 22° *C.* (50° *to* 72° *F.*) (*fluctuating*). Apart from an initial fall in titre in one of three batches tested, no significant change was found after 10 weeks.

10° *to* 20° *C.* (50° *to* 68° *F.*) (*fluctuating*). Significant loss of virus had not occurred at 2 months.

4° *C.* (39° *F.*) (*constant*). No significant change was evident at 6 months.

— 4.4° *C.* (*constant*). No significant change was noted at 7 months.

— 20° *C.* (*constant*). No deterioration was found for periods of up to 2 years.

Discussion

An inherent weakness of biological titrations is the sampling error of the material under test. This is frequently the explanation of anomalous results, such as apparent variations in the virus content of 2 ampoules from the same batch of vaccine, or an apparent rise or fall in titre after brief periods of storage. For example, in Table I, the apparent rise in titre of Batch 2, stored at 10° to 20° C. (50° to 68° F.) (2nd test) over the first month, was almost

TABLE I
THERMAL STABILITY OF EGG-ADAPTED CANINE DISTEMPER VIRUS

Time	Temperatures Used and Batches Tested														
	37° C. (98·6° F.)		32° C. (90° F.)		18° to 32° C. (64° to 90° F.)			18° to 28° C. (64° to 82° F.)			10° to 22° C. (50° to 72° F.)			10° to 20° C. (50° to 68° F.)	
	1	2	1	2	3	4	5	3	4	5	3	4	5	2 Test 1	2 Test 2
0 days	4·8	4·8	4·8	4·8	4·5	3·7	3·9	4·5	3·7	3·9	4·5	3·7	3·9	4·8	4·8
1 ,,	4·0	4·0	5·0	4·8											
2 ,,	2·8	3·0	3·8	4·0											
3 ,,	2·0	2·3	2·5	2·8											
4 ,,		2·4		2·7											
8 ,,		2·0		2·4	3·9	3·7	3·7	4·2	3·6	3·7				4·0*	5·0
2 weeks	0	0·3	1·0	1·2	3·5	3·3	3·1	3·4	3·4	3·6				4·0	5·0
3 ,,		0	0	0·7							3·2	3·4	3·3	4·0	5·2
4 ,,				0	1·8	2·2	2·2	2·8	2·9	2·5					5·2
5 ,,					2·0	2·8	2·4	2·8	2·8	2·8	2·9	3·3	3·2		
6 ,,					1·2	1·6	1·5	2·5	2·5	2·8	3·3	3·4	3·4		
8 ,,														4·0	4·4
10 ,,											3·2	3·7	3·6		
4 months														3·8	
7 ,,														0·3	1·4

Time	4° C.			−4·4° C.			−20° C.							
	1	6	2	1	6	2	7	8	9	10	11	12	13	14
0 days	4·8	4·7	4·8	4·8	4·7	4·8	4·3	4·2	4·3	4·2	4·4	5·0	3·9	3·8
1 month	4·3		4·6	4·8	4·6	5·0								
3 months	4·2	5·0	4·5											
5 ,,	3·8	4·8	5·0	4·0†	4·0†	4·6								
6 ,,	4·0	4·4	4·8											
7 ,,				4·3	3·9	4·1								
10 ,,	3·5	3·4		3·6	3·9			4·0	4·0					
11 ,,										4·1				
14 ,,							4·1							
15 ,,					3·3						4·7			
21 ,,												4·9		
24 ,,													4·0	3·9

* During the first test on batch 2 at 10° to 20° C., temperatures exceeding 20° C. occurred accidentally. This accounts for the initial fall in virus titre.

† Batches 1 and 6, held at −4·4° C., were accidentally subjected to thawing prior to the 5th month titration.

Titres are expressed as negative log reciprocals.

Differences of less than 1 log should not be regarded as significant.

certainly due to technical errors. The results reported in this article, therefore, should be evaluated by consideration of general trends over complete periods of storage, and a loss of less than one log of virus should not be regarded as significant.

The egg-adapted vaccines tested were clearly stable for long periods when maintained in the frozen state. There was, however, a marked difference in the effect of the domestic refrigerator ice-box temperature used (− 4.4° C.) and deep-freeze temperatures (about − 20° C.) in these experiments. According to these results it would seem that deep-freeze temperatures

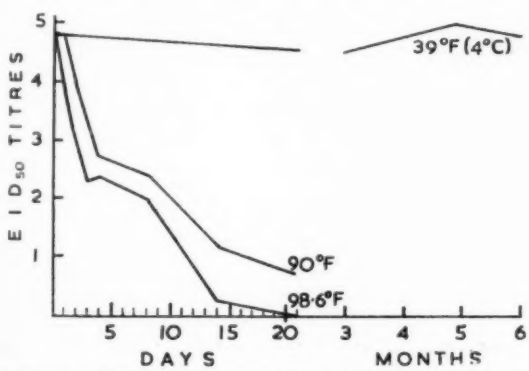

FIG. 1.—Stability of egg-adapted Distemper virus at constant temperatures.

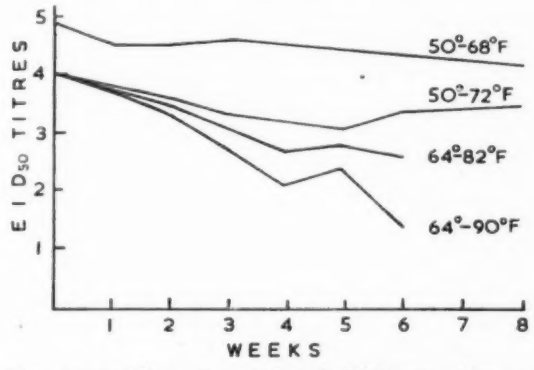

FIG. 2.—Stability of egg-adapted Distemper virus at fluctuating temperatures.

are necessary for very prolonged storage. Surprisingly, no very marked difference was noted in the results of the + 4° C. and — 4.4° C. temperatures although one batch retained its potency satisfactorily at the lower temperature for at least 10 months. Recommendations that vaccine should preferably be stored in the freezing compartment of a domestic refrigerator are obviously sound. Variations between the keeping properties of different batches of vaccine may possibly have been due to variations in moisture content. No difference was noted between batches sealed in glass ampoules filled with nitrogen, and batches sealed *in vacuo* in rubber-stoppered bottles.

Exposure to constant high temperatures of 37° C. (98.6° F.) and 32° C. (90° F.) for more than 24 hours is clearly dangerous. In this connexion it may perhaps be pointed out that temperatures in this range may be reached in the boot or glove-box of a car in summer weather and the danger of leaving vaccine in such situations for more than a few hours cannot be over-emphasised.

The results with vaccine exposed to fluctuating temperatures, designed to simulate various kinds of room temperature conditions, are of some interest. Direction pamphlets prescribe the length of time vaccine may be kept at "room temperature," but the proper interpretation of this is by no means clear. Quite obviously there are substantial differences between room temperatures in the north of Scotland and the south of England. A clear statement of the meaning of "room temperature" in terms of degrees Centigrade or Fahrenheit is desirable. In these experiments, significant loss of virus over periods of many weeks was prevented when the maximum temperature reached was not more than 22° C. (72° F.). It is suggested, therefore, that a realistic interpretation of "room temperature" should be 20° C. (68° F.) or less; in these conditions properly manufactured egg-adapted C.D. vaccines may be relied upon to retain sufficient potency for at least 2 months. The danger of exposing vaccine to temperatures much higher than this are clearly indicated by the results reported.

One other experiment was conducted. The question is sometimes asked whether vaccine that has been removed from cold storage and subjected to relatively high temperatures for several hours may be returned to the refrigerator without risk of accelerated deterioration due to damage done during exposure to higher temperatures. Two lots of ampoules from Batch 2 were exposed for 2 days at 37° C. (98.6° F.) and 32° C. (90° F.) respectively and then placed in a refrigerator. Both lots lost virus due to exposure at high temperatures, but thereafter, over a period of 4 months' testing, no further deterioration occurred (Table II).

TABLE II
THERMAL STABILITY OF EGG-ADAPTED CANINE DISTEMPER VIRUS

Batch	Pre-exposure titre	Temperature	The effect of exposure to high temperatures followed by storage at +4° C. Weeks at + 4° C.					
			1	2	3	4	12	16
2	4·8	37° C. for 2 days then at +4° C.	3·0	3·4	3·4	3·2	3·5	3·4
2	4·8	32° C. for 2 days then at +4° C.	4·0	4·2	3·4	4·0	3·9	4·0

Acknowledgment.—My thanks are due to Miss Y. Watkin who carried out the titrations.

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AFRICAN HORSE SICKNESS

Dr. E. Moulton, Food and Agriculture Organisation vaccine production expert in Turkey, has reported that no case of African horse sickness has been found there during the past six months, and that the threat of the disease spreading to Europe and the U.S.S.R. has receded.

This is the result of emergency action taken by the FAO to control the disease, which caused the loss of more than 300,000 horses in 1960, by forming a "cordon sanitaire." Turkey was the "buffer" against the spread of the disease to Europe.

MEMORIAL HALL TO A VETERINARY SURGEON

The Dunlop Memorial Hall, now nearing completion at Dreghorn, Ayrshire, will be opened in October.

Dreghorn is the birthplace of John Boyd Dunlop, the Scottish veterinary surgeon who invented the first practicable pneumatic tyre in Belfast in 1888.

Members of the John Boyd Dunlop family have contributed to the cost of the hall, and the Dunlop Rubber Company has also made a grant.

The Metabolism Rate of Boar Spermatozoa in Unbuffered Whole Gel-free Semen with added Fructose

BY

PETER RADFORD
Department of Animal Husbandry, University of Bristol

SUMMARY.—Fructose usage and lactic acid production in milligrams per 10^9 sperms were measured in whole gel-free boar semen stored at 20° C., 30° C. and 37° C.

Changes in the pH of seminal plasma were measured in semen stored at 37° C.

As storage temperature increased so the average hourly rate of fructose usage and lactic acid production rose.

Augmentation of semen with fructose increased sperm survival but not to the point when this could be considered as a satisfactory storage technique.

FRUCTOSE was first isolated from seminal plasma by Mann (1945) and the concentrations of fructose in the semen of various species were given by Mann (1954). That the source of fructose was the seminal vesicles was amply demonstrated by Mann (1946), Davies and Mann (1947) and Humphrey and Mann (1948).

Glycolysis of fructose in bull and boar semen was reported on by Mann (1948) and Mann and Leone (1953), and the effect of fructose concentration in semen on fertility was investigated by Gassner, Hill and Sulzberger (1952) and Bishop, Campbell, Hancock and Walton (1954).

A correlation between glycolysis, lactic acid production and changes in the *p*H of the seminal plasma was demonstrated by Comstock (1939), Webster (1939), Moore and Mayer (1941), Laing (1945), and Reid, Ward and Salisbury (1948).

Most studies of sperm fructolysis, recorded in the literature, were carried out on bull and ram semen; and since boar semen metabolism had been largely neglected, and since boar semen was known to have a low fructose content, it seemed important that this gap in the knowledge was filled. It was considered that it might be possible to extend the life of undiluted gel-free boar semen, under semi-anaerobic conditions, simply by the addition of fructose. Therefore the metabolism rate, in terms of fructose usage and lactic acid production, and the survival time of boar sperms stored at various temperatures were measured.

Plan of the Experiment

Three experiments were conducted to estimate the metabolism rate of boar spermatozoa in whole gel-free boar semen to which fructose was added at the start of each experiment. In each experiment the following estimations were made:–

(a) Fructose usage and lactic acid production in semen stored at 20° C.

(b) Fructose usage and lactic acid production in semen stored at 30°C.

(c) Fructose usage, lactic acid production and *p*H variations in semen stored at 37°C.

Materials and Methods

At the start of the ejaculate the preputial fluid was discarded and the whole of the rest of the ejaculate was collected. No attempt was made to fractionate the ejaculate and only one ejaculate was collected at each service. Immediately after collection the semen was strained through surgical gauze to remove the gel fraction which was discarded.

TABLE I
THE METABOLISM RATE OF BOAR SPERMS IN WHOLE GEL-FREE SEMEN TO WHICH FRUCTOSE WAS ADDED AT THE RATE OF 8 MILLIGRAMS PER 10^9 SPERMS, STORED AT VARIOUS TEMPERATURES, IN TERMS OF FRUCTOSE USAGE, LACTIC ACID PRODUCTION AND *p*H CHANGES OF THE SEMINAL PLASMA

Storage temperature °C.	Hours of storage	Fructose mg. per 10^9 sperms				Lactic acid mg. per 10^9 sperms				*p*H Seminal plasma			
		Total samples	Total used	Mean hourly usage	Standard deviation	Total samples	Total produced	Mean hourly production	Standard deviation	Total samples	Depression of *p*H	Mean hourly depression	Standard deviation
20	3½	6	0·71	—	0·51	6	0·47	—	0·30	—	—	—	—
	22	6	3·61	0·16	0·94	6	1·95	0·09	0·24	—	—	—	—
30	3	6	0·87	—	0·60	6	0·60	—	0·17	—	—	—	—
	5	6	1·48	—	0·59	6	1·38	—	0·69	—	—	—	—
	22	6	4·77	—	1·24	6	2·97	—	1·17	—	—	—	—
	27	6	5·82	0·22	1·71	6	3·42	0·13	1·38	—	—	—	—
37	1½	9	1·23	—	0·70	10	0·67	—	0·37	9	0·23	—	0·14
	3½	8	2·08	—	0·89	10	1·65	—	0·87	8	0·37	—	0·11
	5½	9	2·83	0·52	0·96	8	2·25	0·41	1·61	8	0·48	0·09	0·16

The sperm density of the sample was measured nephelometrically (Radford & Herdan, 1961), and fructose added as a 10 per cent. solution of D(—) Fructose (B.D.H. Laboratory Reagent) at the rate of 8 mg. per 10^9 sperms.

Fructose concentrations were measured by the method described by Mann (1948) except that boar semen was not mixed with phosphate buffer during incubation since it was shown to be lethal to boar sperms. Fructose estimations were, therefore, carried out on a mixture of 1 part of unbuffered whole gel-free boar semen to 29 parts of distilled water. Colour development was measured in an Evans electro-selenium colorimeter.

The concentration of lactic acid in semen was determined by the method described by Friedman and Graesner (1933). Since limited quantities of semen were available half the recommended volumes of test liquid and reagents were used.

Estimations of fructose, lactic acid, and *p*H were made at the times shown in Table II on all semen samples in all experimental series with only a few exceptions. In all experiments fructose usage and lactic acid production was measured in terms of milligrams per 10^9 sperms. Variations in *p*H were related only to the seminal plasma and not to sperm population.

TABLE II
THE SURVIVAL TIMES OF BOAR SPERMS STORED AT VARIOUS TEMPERATURES IN UNBUFFERED WHOLE GEL-FREE SEMEN WITH ADDED FRUCTOSE AT THE RATE OF 8 MILLIGRAMS PER 10^9 SPERMS

Storage temperature	Number of samples	Mean Survival time hours	Range of Survival time hours	Standard deviation
20° C.	86	43·57	16—125	23·15
37° C.	32	16·16	6—45	11·04

An attempt was made to estimate the ratio of live to dead spermatozoa by the nigrosin-eosin differential staining technique in which live sperms remain colourless and dead sperms take the stain. The method was considered to be unreliable because the majority of spermatozoa appeared to fall into an intermediate class, *i.e.* they were only faintly stained and it was impossible to decide whether they were alive, dead or dying.

Similarly, a subjective scoring of semen motility was discarded because it was found that scores were not repeatable, especially where it was necessary for 2 workers to assess the motility of the same semen sample during storage. A semen sample, therefore, was said to be still alive when sperm were seen, under 1/6 inch objective, to be making progressive forward movement. When only flagellation or twitching of the sperm tails was seen it was considered to be dead.

Results

Live sperms were present in all semen samples included in the results, given in Table I, at 22 hours, 27 hours and 5½ hours for semen stored at 20° C., 30° C. and 37° C. respectively. Semen samples in which all sperms were dead before these times were excluded from the metabolism studies. Nevertheless, in Table II are shown the survival times of sperms, in whole gel-free semen to which fructose was added, for 86 samples stored at 20° C. and for 32 samples stored at 37° C. It was noted that the range of survival time, as reflected in the size of the Standard Deviation, was wide. Sperms stored at 20° C. and 37° C., however, survived for an average of 43.57 and 16.16 hours respectively. On the other hand sperms in whole semen to which no fructose was added lived for an average of only 7.0 and 3.8 hours when stored at 20° C. and 37° C. respectively.

The results of the metabolism experiments are presented in Table I. For sperms stored at 20° C. the average hourly rate of fructose usage and lactic acid production by 10^9 sperms was 0.16 and 0.09 mg. respectively. From Fig. 1 it was seen that the longer storage proceeded the more widely the curves diverged.

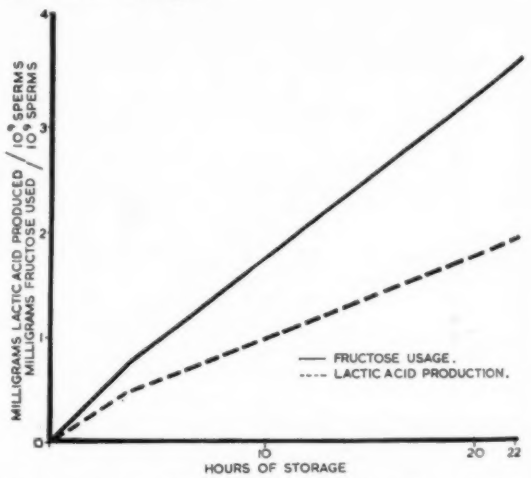

FIG. 1.—Average fructose usage and lactic acid production by boar sperms in 6 ejaculates of whole gel-free semen stored at 20° C.

Six samples of semen were stored at 30° C. and the average hourly rate of fructose usage and lactic acid production by 10^9 sperms was 0.22 and 0.13 mg. respectively. Although the curves, as shown in Fig. 2 were parallel for the first 5 hours of storage, they subsequently diverged as was observed for semen samples stored at 20° C.

In the third series of experiments, 10 samples of semen were stored at 37° C.; *p*H changes of the seminal plasma as well as fructose usage and lactic acid production were measured. Over a period of 5½ hours' storage, the *p*H fell by an average of 0.09 *p*H units hourly, and the average hourly rate of fructose usage and lactic production by 10^9 sperms was 0.52 and 0.41 mg. respectively. From Fig. 3 it was seen that all 3 factors of metabolism proceeded curvilinearly and the marked divergence of the curves for fructose usage and lactic acid production seen in Figs. 1 and 2 was not observed.

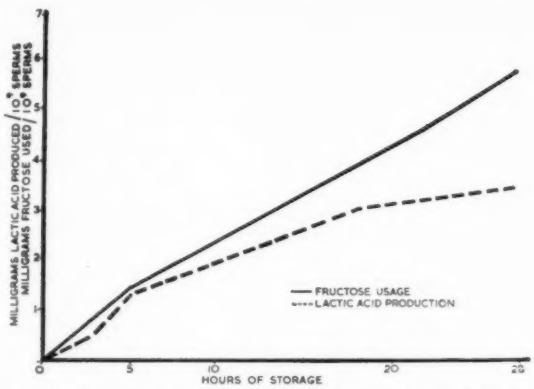
MILLIGRAMS LACTIC ACID PRODUCED / 10⁸ SPERMS
MILLIGRAMS FRUCTOSE USED / 10⁸ SPERMS
FRUCTOSE USAGE
LACTIC ACID PRODUCTION
HOURS OF STORAGE

FIG. 2.—Average fructose usage and lactic acid production by boar sperms in 6 ejaculates of whole gel-free semen stored at 30° C.

It was clearly shown, however, that boar sperms, in unbuffered whole gel-free semen were able to metabolise many times the quantity of fructose naturally occurring in boar semen. As storage temperature was increased from 20° C. to 37° C. the hourly

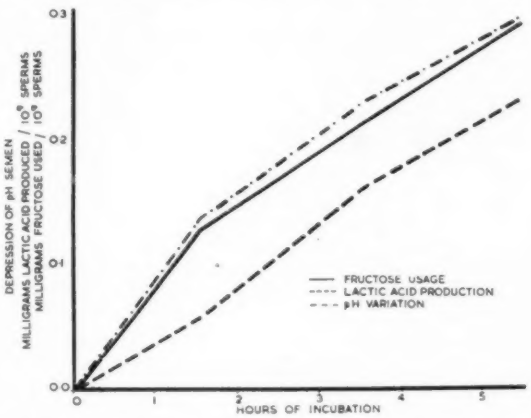

FIG. 3.—Average fructose usage and lactic acid production by boar sperms in 10 ejaculates of whole gel-free semen and changes in the *p*H seminal plasma stored at 37° C.

rate of fructose usage and lactic acid production increased, but, increase in metabolism rate was not directly proportional to the rise in storage temperature. The relationship between hourly fructose usage and lactic acid production and storage temperature proved to be curvilinear as is shown in Fig. 4.

Discussion

The exceptionally low fructose content of freshly ejaculated boar semen suggested that a possible approach to its successful preservation might lie in the addition of fructose to whole gel-free boar semen. Hence the metabolism rate and survival time of boar sperms in undiluted semen stored at 20° C., 30° C. and 37° C. were investigated.

It was shown by Polge (1956) and Niwa (1958) that immotile sperms in boar semen could be reactivated by warming and shaking semen with oxygen, thus stimulating aerobic metabolism. The provision of an extracellular source of energy seems to be a more permanent means of maintaining motility since utilisation of extracellular sources of energy is carried on anaerobically or semi-anaerobically, conditions which normally obtain during laboratory storage of semen.

It was established, during the course of the experiment, that boar sperms in undiluted semen were able to survive longer in seminal plasma augmented

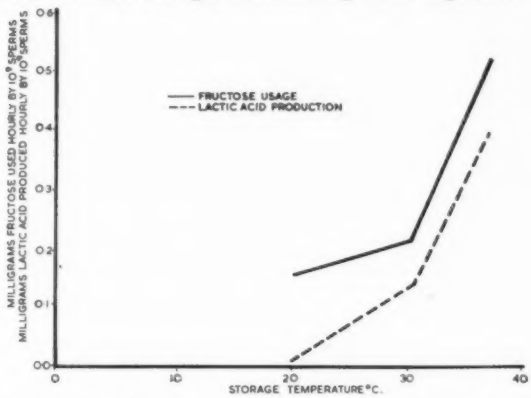
MILLIGRAMS FRUCTOSE USED HOURLY BY 10⁹ SPERMS
MILLIGRAMS LACTIC ACID PRODUCED HOURLY BY 10⁹ SPERMS
FRUCTOSE USAGE
LACTIC ACID PRODUCTION
STORAGE TEMPERATURE °C.

FIG. 4.—Hourly rates of fructose usage and lactic acid production by 10^9 sperms in whole gel-free boar semen stored at 20° C., 30° C. and 37° C.

with fructose than in plasma unaugmented with fructose.

From Fig. 1 and 2 it is seen that the longer storage lasted, and the further metabolism proceeded, the more widely divergent became the curves for fructose usage and lactic acid production. This was unexpected since theoretically 1 mg. of fructose is equivalent to 1 mg. of lactic acid. Mann (1951) showed, however, that even in an atmosphere of 1 per cent. oxygen, ram sperms were capable of oxidising lactic acid to lactate which can act as a substrate for mammalian sperms.

In semen stored at 20° C., sperms survived longer than in semen stored at 30° C. or 37° C., but sperms in whole semen stored at less than 15° C. quickly became immotile and could not be reactivated. The average length of time, during which progressive forward movement of sperms was observed, was at 20° C. (43 hours) and at 37° C. (16 hours). During the storage period the percentage of motile sperm gradually declined and it was considered that although the addition of fructose to semen prolonged the survival time of sperm under anaerobic storage conditions it did not provide a suitable method of preserving semen for artificial insemination purposes.

Acknowledgments.—Thanks are due to Horlicks Farms and Dairies Ltd., Somerset Cattle Breeding Centre and to Mr. J. Stower, the veterinary surgeon in charge for the provision of boar semen, to Mr. R. Eglon for the collection of semen and to Mrs. B.

(*Concluded at foot of col. 1 overleaf*)

Divisional News

THE SCOTTISH BRANCH

The annual general meeting was held in the Royal (Dick) School of Veterinary Studies, on June 7th, 1961. The President, Mr. K. P. Anderson, was in the chair. Forty-nine members and 4 visitors were present. Apologies for absence were received from 7 members.

Minutes

The minutes of the meeting held in Glasgow on February 22nd, 1961, having been published in THE VETERINARY RECORD of March 18th, 1961, were read and signed as a correct record.

Correspondence

Letters from the General Secretary, B.V.A., concerning: "Re-constitution of the Council of the B.V.A." and "Broken hypodermic needles in flesh food animals" were held over, pending reports from the constituent Divisions.

The Hon. Secretary's Report

Possibly the most significant development in the work of the Division during the period 1959/61 has arisen from the investigation into a complaint regarding charges for penicillin. This matter was referred to in the last hon. secretary's report, and led to a meeting between representatives of the Scottish Branch and the National Farmers' Union of Scotland. This meeting was much wider in scope than merely an investigation into a specific complaint. During the course of the meeting the National Farmers' Union, Scotland, invited an article on "The Use and Abuse of Antibiotics" for publication in their journal. A suitable paper written by the General Secretary, B.V.A., has been submitted for publication. As a further outcome of the meeting with the National Farmers' Union, Scotland, it was suggested that a permanent liaison committee be set up between the two organisations. This suggestion was welcomed warmly by the General Purposes Committee of the National Farmers' Union, Scotland, and awaits the confirmation by their annual general meeting.

A letter written to the R.C.V.S. in February, 1960, concerning a complaint made by two of our members, elicited a reply in June of the same year. The matter appeared to have been dealt with to the members' satisfaction.

The comments of the Branch on the revised Food (Meat Inspection) (Scotland) Regulations, 1960, were invited by the Department of Health. The comments of Messrs. Hardwick, Ferguson, and Norval—on the proposed revision—were sought. Their comments were put before the members of the Division's Executive Council, whose final amendments were forwarded to the Department of Health. In the latest regulations, the Department has accepted practically all the amendments suggested.

A successful joint meeting with the Society of Practising Veterinary Surgeons was held at Stirling—when 35 members were able to attend. The Scottish Council for Physical Education made the request for a representative of the Branch to serve on a committee concerned with Pony Trekking. Mr. A. S. Chapman was nominated to serve as representative of the Branch.

At a Branch meeting in Glasgow, Professor D. S. Hendrie gave an address entitled "Prospects for British Agriculture"; this address was published in THE VETERINARY RECORD. In view of the high proportion of members of the Branch engaged in research, it was satisfactory to know that the honorary secretary of the Branch was given the opportunity to serve on the Editorial Committee of the B.V.A.

Hon. Treasurer's Report

The honorary treasurer's report was presented and adopted by the meeting.

Election of Officers and Council

The following officers were elected for the year 1961/62:—

President: Mr. A. S. Chapman; Senior Vice-President: Mr. K. P. Anderson; Junior Vice-Presi-

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The Metabolism Rate of Boar Spermatozoa in Unbuffered Whole Gel-free Semen with added Fructose —*Concluded.*

Newton and Mr. R. Ivens for doing much of the routine experimental work.

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dent and President elect: Mr. M. McLellan; Honorary Secretary/Treasurer: Dr. F. Alexander.

Messrs. Begg, Hardwick, Inglis, Jennings, Thompson and Watt were elected as additional members of Council. The President and honorary secretary were elected to represent the Branch on the Council, B.V.A.

The Presidential Address

The President said that the year had not been particularly eventful, but, as the honorary secretary said, probably the most important event was the establishment of a permanent liaison committee between the Scottish Branch and the Scottish N.F.U. The President placed great importance on this, and said he looked forward to the committee being formed. Those who met the N.F.U. Council—some 18 months ago—would remember—with pleasure—the cordial reception and the patient hearing given. Although the meeting arose from a complaint against the veterinary profession, it gave the opportunity not only of answering the complaint, but of putting forward our point of view on many topics of mutual interest; this indicated the advantage of a permanent liaison with the N.F.U.; moreover, as the climate of opinion within the N.F.U. seemed to be favourable, it was felt advisable to make the suggestion while the previous meeting was still fresh in everyone's mind. The establishment of this liaison committee, now, only awaits ratification by the N.F.U. annual general meeting. It will then be necessary for this Division to appoint the veterinary members of the committee.

During the year the Division held no meetings at which a clinical subject was discussed. This was a deliberate policy, as the Council felt that the Scottish Division should be a political forum, and should not attempt to compete with the Divisions in the presentation of clinical material. The President hoped that members would agree this was the correct policy for the Division to adopt. Following this policy, they had had two meetings this year—the one held jointly with the Society of Practising Veterinary Surgeons, and was devoted to a discussion on the Costing Survey carried out by that Society, and the other was a survey of future trends in agriculture, given by Professor Hendrie of the West of Scotland College of Agriculture. It was particularly interesting to notice the attendances at these meetings. The first, a subject of great importance to every practitioner in the country, had an attendance of 35, some of whom were there as members of the S.P.V.S. From the whole of Scotland this was not very encouraging. However, at the meeting at which Professor Hendrie gave his paper, only 6 practitioners attended. The President said that the strength of an association such as theirs depended on the enthusiasm of its members, and when a paper on the future of the industry—on which our livelihood depends—attracted an audience of under 2 per cent. of the potential members, he was unable to feel optimistic about the future of his Association. He felt that a greater interest in veterinary politics was essential among all members of the B.V.A.

The President considered that the slight recession in agriculture which is at present with us and the greater recession which was forecast during the next 10 years, made it essential for the veterinary profession to give an efficient service. Speaking as a practitioner, he thought that the peak was passed, and that it appeared fairly certain that there would be less routine work and more work of an advisory character.

The farming industry during the last two decades has become accustomed to being supplied with large quantities of advice by all sorts of advisers, both official and commercial. This advice was free, and almost the only advice they had to pay for was that of their veterinary surgeons. It was essential to ensure that they felt the expense well justified. It would be essential to become familiar with a complete programme of disease prevention in all the various types of farming in Scotland, and to relate these programmes to farming economy.

Owing to the great advances which have taken place in veterinary science during the last 20 or 30 years, and the emergence of specific treatments, many cases—formerly treated by veterinary surgeons—were being treated by the owners: milk fever, staggers, etc. Fortunately, many of the specifics are controlled either by the Dangerous Drugs Acts or by the Therapeutic Substances Act; but unfortunately a few chemists sell antibiotics without prescriptions. This is a state of affairs which requires rectification, in particular, to try to limit the production of antibiotic resistant strains of bacteria, which are becoming increasingly prevalent.

With this type of competition there was no longer any justification for rivalry between neighbouring practices; it was essential for neighbouring practitioners to work together. Veterinary surgeons are the only people in this country trained to diagnose and treat animal disease. The word diagnose was the operative word, as—without a diagnosis—treatment was empirical. Hence, our services would always be essential. Neighbouring practitioners should meet frequently, and discuss their difficulties and problems. It should be remembered that the friendship of one's neighbouring practitioner was worth a great deal more than any single client. This working together led, naturally, to what was probably the next development, namely, group practice. Many practices to-day were in danger of becoming over capitalised, and in a relatively small area there must be duplication of resources and equipment, much of which is less than fully employed. Some pooling of these resources was inevitable in the future. It was one alternative to a national scheme.

Induction of New President

The President then welcomed Mr. A. S. Chapman as the new President for the year 1961-62.

Any Other Business

A collection for the Victoria Veterinary Benevolent Fund yielded £2 15s.

THE NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION

The summer general meeting was held in the Medical Preview Theatre, King's College, Newcastle upon Tyne, 1, on Friday, July 7th, 1961, at 2.30 p.m.

The President, Mr. D. Buntain, was in the chair. There were 12 members present.

Films

Two films loaned by Messrs. Pfizer Ltd., "Dynamics of Phagocytosis" and "Stress and the Adaptation Syndrome," were shown. Both films showed much technical detail, and were appreciated by those present.

Minutes

The minutes of the previous meeting were read and signed.

Correspondence

The following letters were read from the General Secretary, B.V.A., concerning (1) broken hypodermic needles in flesh food animals and (2) the report of the sub-committee on election of Council, B.V.A. After a discussion, the meeting endorsed the findings of the sub-committee.

Annual Dinner/Dance in aid of V.V.B.F.

It was agreed to hold this function, if possible, in December, at the Gosforth Park Hotel.

Election of Members

Mr. C. Bewsher was elected to membership.

Any Other Business

Mr. G. D. Curry brought forward the following points: (1) That the new method of publishing divisional minutes in the body of THE VETERINARY RECORD is a bad one; (2) That it was an opportune time for the Public Relations Officer to arrange for a press notice on the "New dog disease," and also to convey his knowledge of the position concerning swine fever in this country; (3) That it would be advisable for divisional officers of the Animal Health Division to inform practices in their area as soon as a notifiable disease was confirmed; (4) That the Editor of THE VETERINARY RECORD should revert to the old way of publishing infected premises, *i.e.* on a county basis.

After a discussion the members present agreed with these views; and the secretary was instructed to write to the General Secretary of the B.V.A. asking that the matters be considered.

THE SCOTTISH METROPOLITAN DIVISION

The Annual General Meeting was held in the Royal (Dick) School of Veterinary Studies, Edinburgh, on February 8th, 1961, at 2.30 p.m.

The President, Mr. E. G. Wood, was in the chair, and 39 members and 4 visitors were present. Apologies for absence were read from 10 members.

Minutes

The minutes of the autumn meeting of October 5th, 1960, were taken as read, approved and signed.

Membership

A letter was read from Mr. H. F. Downie of Falkirk intimating his resignation from membership of the Division, and this was accepted with regret.

The following were elected to membership: Messrs. W. S. Johnston, N. S. M. Macleod, A. C. Rowland and Dr. W. M. Stokoe of Edinburgh, Messrs. J. Strachan and J. W. Taylor of Perth. With the election of these gentlemen, the divisional membership rose to 137 (8 honorary members and 129 ordinary members).

Election of Office Bearers for 1961-62

The following office bearers were elected for the year 1961-62:

President: Dr. P. S. Blackburn.
Senior Vice-President: Mr. E. G. Wood.
Junior Vice-President: Dr. D. I. Nisbet.
Honorary Secretary: Mr. I. S. Beattie.
Honorary Treasurer: Mr. E. A. McPherson.
Members of Council: The office bearers together with Mr. A. Whitelaw, Dr. A. Foggie, Mr. J. F. Watson and Mr. K. P. Anderson (co-opted member).
Representatives to Council B.V.A.: Mr. K. P. Anderson, Mr. I. S. Beattie and Dr. P. S. Blackburn.
Honorary Auditors: Professor G. F. Boddie, Major W. Harris.

Secretary's Report

In his report, the secretary suggested that members might reconsider what the functions of the Division should be, in view of the recent emergence of non-geographical Divisions and other groups which held regular meetings in the area of the Division, competing directly with it for the support of its members. The report was approved.

Treasurer's Report

In his report, the treasurer pointed out that the extent of the credit balance was due in a large part to the arrears collected during the year, and that care would be necessary if a satisfactory balance was to be achieved in 1961 and a rise in subscription avoided. He drew attention to the fact that following a change in policy, the Division's contributions to the Victoria Veterinary Benevolent Fund had increased from approximately £18 to over £50 and this was received with acclamation. The treasurer also submitted a separate account for the annual supper dance, and put a number of proposals to the meeting which were aimed at clarifying the responsibilities of the Division's office bearers in respect of this function. After some discussion the proposals were carried and the treasurer's report approved.

Presidential Address

The President, Mr. E. G. Wood, gave an address in which he reviewed some of the changes which had taken place in small-animal practice and in particular the alterations in the veterinary surgeon/client relationship. He stressed the need for improving

this, both through the ordinary everyday contacts of the veterinary surgeon with his clients, and by more energetic public relations work by the profession as a whole. He felt that only in this way would the public come to appreciate more clearly the value of the veterinary surgeon to the community with the consequent improvement in his status.

Installation of New President

Following his address, Mr. E. G. Wood introduced the new President, Dr. P. S. Blackburn and vacated the chair in his favour. Dr. Blackburn congratulated Mr. Wood on his Presidential Address and paid tribute to his conduct in the chair during his year of office.

Other Business

A letter was read from Mr. K. P. Anderson concerning the notification to veterinary surgeons in private practice of outbreaks of foot-and-mouth disease in their area. There was considerable discussion, but the meeting decided to take no action.

It was announced that the summer meeting of the Division would be held in the Golden Lion Hotel, Stirling, on the afternoon of the June 8th.

Papers

Three short papers, each followed by discussion were presented as follows :

Mr. N. J. L. Gilmour—" Clinical Observations on Pneumonia in Experimental Sheep."

Mr. T. B. Nicholson—" The Treatment of Ostertagiosis in Calves."

Mr. H. S. McTaggart—" A possible relationship between the level of milk production and the fertility of the dairy cow."

Dr. Nisbet proposed a vote of thanks to the 3 speakers and the meeting adjourned for tea with further informal discussion.

A collection on behalf of the Victoria Veterinary Benevolent Fund realised £3 8s. 3d.

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The summer meeting was held in the Golden Lion Hotel, Stirling, on June 8th, 1961, at 2.30 p.m.

The President, Dr. P. S. Blackburn, was in the chair and 23 members and 9 visitors were present. Apologies for absence from 17 members were read.

Minutes

The minutes of the Annual General Meeting of February 8th, 1961, were read, approved and signed. Arising from the minutes the secretary reported that there had been a very poor response to a circular suggesting a divisional poultry course, and further, that a proposed 5-day refresher course to be held at Lasswade had been cancelled through lack of support. After some discussion, it was decided that the matter of a divisional poultry course should be kept in mind for the future. It was reported also that only one Scottish member had shown interest in the proposed meat inspection refresher courses, and in the circumstances he had been advised to get in touch with the North of England Division which was organising such a course.

A letter from the Editor THE VETERINARY RECORD intimating the cessation of publication of the Supplement was considered and it was agreed that abridged versions of the minutes would be submitted for publication in the body of the RECORD.

Correspondence

A number of letters from the General Secretary, B.V.A. were read to the meeting. There was some discussion of the report of the sub-committee appointed to consider the election of Council B.V.A. and while this was given general approval, the secretary was instructed to write to headquarters for amplification of the final paragraph indicating the way in which the figure of " genuine members " was to be obtained for the annual return.

Membership

The following were elected to membership :

Messrs. P. Eyre and P. Imlah of Edinburgh and Mrs. A. Gibson of Melrose. With the election of these members Divisional numbers rose to 139 (8 honorary members and 131 ordinary members).

Address by Mr. P. R. Greenough

Mr. P. R. Greenough, F.R.C.V.S. of Castle Cary, addressed the Division on " Some Observations on Diseases of the Bovine Foot." This address was freely illustrated by numerous excellent colour transparencies.

The meeting then adjourned for tea which was provided through the generosity of the President, Dr. P. S. Blackburn.

Following tea, Mr. Greenough showed his colour film, which dealt with a number of the conditions to which he had referred in his address. A short discussion followed and Mr. J. F. Watson proposed a vote of thanks to Mr. Greenough for his address. The meeting terminated at 5.50 p.m.

A collection on behalf of the Victoria Veterinary Benevolent Fund realised £2 6s.

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A party of 24 members then visited the National Pig Progeny Testing Board's Station at Cornton Road, Stirling. Here they were received by Mr. P. J. Mote, the Assistant General Manager of the Board and Mr. J. A. R. Fraser, the Station Manager. After a short talk by Mr. Mote on the work of the Board, the party made a tour of the Station and were then given a further talk on carcase assessment. From the number of questions that were asked, it was clear that members found this visit most interesting and instructive. Dr. P. S. Blackburn proposed a vote of thanks on behalf of the members and the visit ended at 7.30 p.m.

The Annual Banquet

The Association's annual banquet can seldom, if ever, have been held in more splendid surroundings than was the case this year, when, by courtesy of the authorities of Christ Church, it took place in the Great Hall of that college on September 5th. The President presided.

No one who was present will easily forget the scene: the noble hall with its magnificent roof; the illuminated portraits all round the walls, themselves a collection of priceless treasures; the lighting, subdued yet warm, and the gleaming refectory tables. Well may the President have felt a glow of pride and of aesthetic pleasure as, from his seat at the centre of the high table, he looked around him.

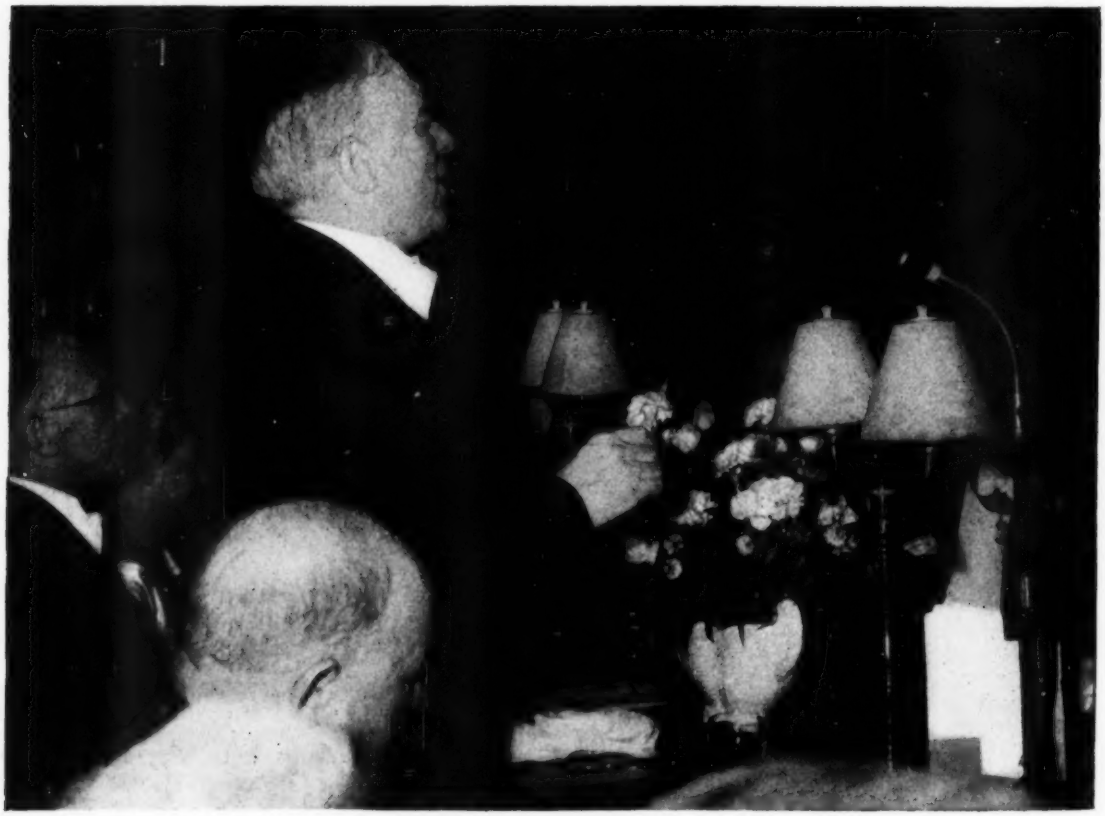
The food and the wines provided by the college, and selected with faultless taste by Mr. N. P. Male and his colleagues on the social sub-committee, were worthy of the setting. In all, this was a banquet indeed, to the eye, to the senses and to the palate, on which those concerned in its arrangement may feel the highest satisfaction.

The City and University of Oxford

In proposing the toast "The City and University of Oxford," Mr. E. J. Heather, chairman of the Congress Provisional Committee, expressed gratitude for the wonderful collaboration which his committee had received from the City and the University of Oxford.

As a result of attending the scientific sessions members of the Association had the opportunity of seeing the development of the science area of the university, little of which existed a few years ago. "With the goodwill I have experienced in the University," said Mr. Heather, "and with the development of the science area—those sciences particularly which affect us most—surely the time cannot be too far distant when this university makes a direct and vital contribution both to primary veterinary education and to post-graduate veterinary education."

Alderman A. H. Kinchin, deputy mayor of Oxford, responded. He recalled that he had been born on a farm where he worked with animals for a number



The President proposes the Loyal Toast.

of years, and said that he would never forget the wonderful work which veterinary surgeons did and were doing to relieve pain and discomfort suffered by animals. It was a great work, and he wished members of the Association well.

Professor Sir Lindor Brown, C.B.E., F.R.S., Waynflete Professor of Physiology, in a reply whose ironic wit was much to the taste of the guests, said he wondered why the Association had come to Oxford. There were veterinary schools in Glasgow and Edinburgh, and he knew there were veterinary schools in Liverpool, Bristol, London and "in another place in a north easterly direction from here," but there was no veterinary school in Oxford. He wondered whether the Association were in Oxford in a missionary spirit!

The British Veterinary Association

The toast to the Association was proposed by Dr. H. S. Frenkel of the Netherlands.

He said that even three centuries ago there was a tendency in the United Kingdom to be internationally minded with regard to science and the truth; to-day the United Kingdom was still international in its wisdom. It had been said that the ways of the Lord were not revealable, but in his view that was wrong. The ways of the Lord were revealable. "I believe that when we pursue our science and our research work we are doing nothing other than trying to reveal the ways of the Lord," he said. In the unceasing search for truth, the British Veterinary Association always had played, and always would play, an important part.

The President, in response, said that during the Congress week, the British Veterinary Association had reason to be grateful to Dr. Frenkel on two counts. First, he had consented to accept Honorary Membership of the Association, and thus had allowed the Association to honour itself; secondly, he accepted an invitation to propose this toast.

At the Annual General Meeting held on the previous day, it had been his (the President's) privilege to propose that Dr. Frenkel be made an Honorary Member. Not only was that seconded and carried unanimously, but it was loudly applauded by members present. "I had occasion at that meeting to remind members that science knows no rational boundaries," Mr. Jennings said to Dr. Frenkel; "your scientific achievements have benefited mankind throughout the world."

The President recalled that amongst other discoveries Dr. Frenkel had produced an efficient means of vaccinating food animals and milk-producing animals against foot-and-mouth disease in those countries which were not islands, and where vaccination was essential as opposed to eradication by slaughter. Not only had he benefited mankind in that way, but he had done a great service to those millions of animals that might suffer from that terrible scourge and also other scourges. Yet, still further, Dr. Frenkel had been the salvation of those innumerable animals which might have been used for the production of those types of vaccines which made it necessary to use the living animal. Dr. Frenkel's vaccines, not only against foot-and-mouth disease, but against other virus diseases, made use of tissue culture alone.

The President then presented Dr. Frenkel with the Scroll of Honorary Membership of the British Veterinary Association amid loud and sustained applause.

Dr. Frenkel thanked the President and members of the Association for the great honour which had been bestowed upon him in electing him an Honorary Member; it had made him very proud.

The Guests

In proposing the toast to The Guests, Mr. A. G. Beynon, President-elect, said that due to the large number of distinguished guests present and the lateness of the hour, it would be difficult to mention them all by name. However, he did extend a special welcome to representatives present from the continent of Africa, the United States, Ceylon, the Middle East and from several European countries. He desired to refer particularly to Dr. Seidel from Denmark, who had been President of the Danish Veterinary Association for six years, and to Dr. Petrovitch from Yugoslavia. It was Dr. Petrovitch's first visit, and it was hoped he would go back with pleasant memories of the Congress.

He also extended a warm welcome to Sir John and Lady Ritchie, and said it was the first occasion on which an opportunity had presented itself of congratulating Sir John and Lady Ritchie on the honour conferred upon them by the Queen. (*Applause.*) Sir John had made a great contribution to the veterinary profession in this country as well as internationally. The Association also most cordially greeted Mr. Guy Anderson, President of the Royal College of Veterinary Surgeons, and Mrs. Anderson.

Finally, Mr. Beynon referred to Mr. Salter Chalker of the National Farmers' Union, another guest whom the Association held in especial regard. Mr. Salter Chalker had been the chairman of the Animal Health Committee of the National Farmers' Union for a number of years, and as long as he remained chairman of that committee, the Association could be assured that it had the full support of the farming community in any major schemes put forward in the future.

Mr. J. W. Salter Chalker, O.B.E., J.P., in response, thanked Mr. Beynon and the Association for the hospitality extended to the guests. The veterinary profession, he said, was a part of agriculture, and agriculture depended upon the profession. He referred to the 18 years in which he had been chairman of the Animal Health Committee, during which time, he said, he had enjoyed nothing but friendship from the Royal College of Veterinary Surgeons and all its members and from the British Veterinary Association.

A stirring innovation, and one appropriate to the surroundings, was the introduction of each speaker by a fanfare from trumpeters of the Oxfordshire and Buckinghamshire Light Infantry.

News and Comment

CONGRESS GREETING TO THE QUEEN

On the opening day of Congress the following telegram was sent to the Queen, as Patron of the Association:—

The members of the British Veterinary Association at their 79th Annual Congress, which opens to-day at Rhodes House, Oxford, send their loyal and grateful respects to Her Majesty The Queen, Patron of the Association.

(Signed) S. JENNINGS, *President*.

The following reply was received from Balmoral:—

Please convey to the members of the British Veterinary Association assembled at their annual Congress the sincere thanks of the Queen for their kind and loyal message which Her Majesty as Patron greatly appreciates.

(Signed) Private Secretary.

ANIMAL HEALTH TRUST RESEARCH AWARDS

The Animal Health Trust announces the following awards:—

Research Training Scholarships

W. J. Herbert, M.R.C.V.S., for a course in microbiology and a Ph.D. course in virology at the Department of Bacteriology, University of Edinburgh, under Professor Cruickshank.

R. C. Chubb, B.SC., to investigate the use of the gel diffusion precipitin technique for the diagnosis of infectious bronchitis and pathogenic pleuropneumonia-like organisms. Mr. Chubb will work at the Houghton Poultry Research Station under Dr. R. F. Gordon.

Wellcome Research Fellowships

B. A. Matson, M.R.C.V.S., to make a study of the life cycle of piroplasmosis under Dr. Soulsby at the Department of Animal Pathology, Cambridge University.

I. E. Lush, B.SC., to enable him to extend his work on biochemical polymorphism in birds, and its possible connexion with hybrid vigour, at the Agricultural Research Council's Poultry Research Station, Edinburgh, under Dr. A. W. Greenwood.

MESSRS. WILLOWS FRANCIS

Through a mishap in our printer's binding department last week, some early copies of THE VETERINARY RECORD were produced with the pages out of order. This was rectified so far as the editorial content was concerned, but it had the effect of omitting the advertisement of their products published every week by Messrs. Willows Francis. The disability thus suffered by so old and valued an advertiser is much regretted.

THE LADIES' GUILD DANCE

Each year, during Congress week, one of the most successful social events is the dance organised by the Ladies' Guild of the Victoria Veterinary Benevolent Fund. It was held in Oxford on September 6th at the Randolph Hotel, and proved as great an attraction as ever. The large company present included the President and Mrs. Jennings who, by a happy coincidence, is this year's President of the Guild.

Much of the credit for this most delightful evening was due to the wives of members of the Provisional Committee, and other ladies in and about Oxford, who did a great deal of the preparatory work; while it needs hardly to be said that Mrs. Field, the honorary secretary of the Guild, and her immediate helpers toiled like Trojans—as they always do. The commercial houses had been generous in their gifts, and they were included in the speech of thanks which Mrs. Jennings made with that graciousness and charm which are so characteristically her own.

As readers know, this annual dance is only one of the functions organised by the Ladies' Guild in many parts of the country. It is hoped that members of the profession will continue to support, as generously as they are able, this invaluable voluntary work. From time to time we publish, in the reports of meetings of the V.V.B.F., notes on the cases the Fund assists, and it calls for but little imagination to realise that here are very real domestic hardships and even tragedies among our own professional brethren and their dependants.

The Ladies' Guild has done, and continues to do, very great work towards the alleviation of such distress and we appeal to everyone to help them.

SIR JAMES HENDERSON-STEWART, M.P.

Mr. Harry M. Wilson writes:—

In the death of Sir James Henderson-Stewart, M.P., we have lost a past member (appointed by the Privy Council) of the Council of our Royal College. Sir James told me how much he enjoyed that appointment, and how he thought the work of the Council was good work, well and fairly conducted.

Scotland has lost one of her most respected M.P.s: East Fife was represented by him for 28 years without a break. He was a zealous and devoted servant. Few have gained the respect and popularity which Sir James enjoyed among the people of East Fife, and his clear-headedness and quiet strength of character, allied to a rare personal charm, were outstanding qualities which were invaluable during his term as joint Scottish Under-Secretary; in that office his knowledge of agriculture, education and fishing proved of benefit.

It is only a few weeks ago, when chatting with Sir James in Cupar, that he remarked to me that he "would have to go slower." I fear he was left with too little time to adjust himself. Sir James will be missed but remembered.

It was my sad duty to represent the President and Council of the Royal College at the funeral service in Cupar Old Parish Church on September 6th and thereafter at Cupar Cemetery.

The officiating ministers were the Very Reverend Dr. R. F. V. Scott, of Auchterhouse, a lifelong friend of Sir James (formerly of St. Columba's, Pont Street,

London, of which Sir James was a member), and the Rev. R. Graham Brotherton, Minister of Cupar Old Parish Church.

MR. DUNCAN McDIARMID McINTYRE

Mr. S. R. Campbell writes:—

The news of the sudden death of Duncan McIntyre came as a great shock to his many friends within the profession and the agricultural community.

Duncan McIntyre was born 50 years ago near Kinloch Rannoch and was educated both there and at Perth Academy, later qualifying at Glasgow in 1934. After a short spell in general practice he joined the County Council of Aberdeen as Assistant Veterinary Officer and served at Strichen until 1938 when he was appointed to the Ministry of Agriculture. He was stationed at Cupar until 1953 when on promotion to Divisional Veterinary Officer he was transferred to London quarantine station. Thereafter, he moved to Argyll where he was in charge of the Ministry's animal health office at Oban.

His quiet and unassuming manner endeared him to all who had the privilege of knowing him and he was held in high esteem by the farming community.

Our deepest sympathy is extended to his devoted wife, Eva, and to his brothers and sisters in their great loss.

Duncan was laid to rest at Kinloch Rannoch on Saturday, September 2nd. No greater tribute could be paid to the man than the large number of his friends who journeyed to a remote part of Scotland from far and wide in order to pay their last respects.

The profession was represented by practitioners and whole-time staff of the Ministry and included the following: Messrs. C. C. Bannatyne, G. S. Beattie, K. Campbell, S. R. Campbell, E. F. Hardwick, A. Hamilton, W. Grant, J. Lawson, R. J. Low, G. B. Lewis, M. MacColl, D. J. Macaulay, A. M. Macleod, H. K. MacLachlan, J. G. Souter, A. J. Skea, A. M. Urquhart (representing Sir John Ritchie, C.V.O., and D. S. Barbour, D.C.V.O.), and H. M. Wilson.

PERSONAL

Mr. G. C. Brander will shortly be vacating his post at the Wellcome Veterinary Research Station, Frant, as he has accepted an appointment in the Beecham Research Laboratories.

Mr. G. W. Ford is being promoted to the rank of Assistant Secretary and will succeed Mr. H. Pitchforth on October 2nd as Regional Controller in the South Western Region of the Ministry of Agriculture.

The Ministry's South Western Region comprises the counties of Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire and the Isles of Scilly.

Mr. Eric I. Williams will leave this country in mid-October to take up an appointment at the College of Veterinary Medicine, in the University of Oklahoma. He will have among his colleagues Dr. E. Wynn-Jones with whom he was a student at the Royal Veterinary College.

Marriages

BARR—CULBERT.—At St. Austin's Church, Grassendale, Liverpool, 19, on Saturday, September 9th, 1961, Donald A. Barr, M.SC., B.V.SC., M.R.C.V.S., to Sheila Culbert, B.A.

MANN—SCOTT.—On Thursday, August 17th, 1961, at St. John's Church, Blackheath, London, Christopher James Mann, B.VET.MED., M.R.C.V.S., of Falmouth, Cornwall, to Shirley Margaret Scott, B.A., of Newcastle upon Tyne.

COMING EVENTS

September

20th (Wed.). SOUTH WALES DIVISION. Meeting at the Castle Hotel, Brecon, 2.15 p.m.

SUPPLEMENTARY VETERINARY REGISTER DIVISION. Meeting at 7, Mansfield Street, Portland Place, London, W.1, 2.30 p.m.

25th (Mon.). EAST YORKSHIRE CLINICAL CLUB. Meeting at the Talbot Hotel, Malton, 8 p.m.

27th (Wed.). LANCASHIRE VETERINARY ASSOCIATION. Joint Meeting with the North Wales Division at the Grosvenor Hotel, Chester, 2.30 p.m.

NORTH WALES DIVISION. See Lancashire Veterinary Association above.

SOUTHERN COUNTIES VETERINARY SOCIETY. Meeting at the Royal Hotel, Winchester, 7.30 p.m.

LAKELAND VETERINARY ASSOCIATION. Meeting at the Swan Hotel, Newby Bridge, 6 p.m.

LINCOLNSHIRE AND DISTRICT DIVISION. Meeting at the Angel Hotel, Brigg, 7.15 p.m.

28th (Thurs.). B.S.A.V.A. NORTH EASTERN REGION. Meeting at the Hotel Metropole, King's Street, Leeds, 8 p.m. (N.B.—This meeting has been transferred from Wednesday, September 27th.)

29th (Fri.). B.S.A.V.A. SCOTTISH REGION. Meeting at the Golden Lion Hotel, Stirling, 6.30 p.m.

October

6th (Fri.). MIDLAND COUNTIES VETERINARY ASSOCIATION. Joint meeting with the Shropshire Veterinary Club at the Oak Hotel, Shelton, Shrewsbury, 8.15 p.m.

11th (Wed.). B.S.A.V.A. KENT REGION. Meeting at the Great Danes Hotel, Ashford Road, Maidstone, Kent, 7.45 p.m.

12th (Thurs.). B.S.A.V.A. SOUTH WALES REGION. Meeting at the Queens Hotel, Queen Street, Cardiff, 7 p.m.

17th (Tues.). MID-WEST VETERINARY ASSOCIATION. Supper-Dance in aid of the Victoria Veterinary Benevolent Fund at the Berkeley Café, Clifton, 9 p.m.

20th (Fri.). SOUTH WALES DIVISION. Annual Dinner Dance at the Dragon Hotel, Swansea.

26th (Thurs.). WESTERN COUNTIES VETERINARY ASSOCIATION. Meeting at the Rougemont Hotel, Exeter, 2.15 p.m.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the date on which disease has been confirmed, followed by the postal address and local authority.

Anthrax

September 11th, 1961. J. W. Dixon, Wiggonrigg, Wigton, Cumberland (Parish: Aikton). (Cattle.) CUMBERLAND.

Fowl Pest

September 5th, 1961. D. W. Brooks, Lodge Farm, Horsford, Norwich, Norfolk. NOR84X. Disease at: Mill Lane Farm, Horsford, Norwich, Norfolk. NOR84X. NORFOLK.
September 5th, 1961. L. G. Kirk, 10, Council Houses, Woodfield Close, Weston Longville, Norwich, Norfolk. NOR59X. NORFOLK.
September 6th, 1961. E. J. H. Howe, Mere View, Hodges Hill, Soham, Ely, Cambs. Disease at: Queensway, Soham, Ely, Cambs. CAMBRIDGESHIRE.
September 6th, 1961. Mrs. M. Taylor, 38, High Street, Meppershall, Shefford, Beds. BEDFORDSHIRE.
September 6th, 1961. R. H. Clarricoats, Elm Farm, Black Notley, Braintree, Essex. ESSEX.
September 7th, 1961. Mrs. P. A. Millard, Bury Villa, Meppershall, Shefford, Beds. BEDFORDSHIRE.
September 7th, 1961. T. A. Agate, Toolangi, Lake Lane, Barnham, Bognor Regis, Sussex. WEST SUSSEX.
September 8th, 1961. A. G. Wales, Hill Farm, Easton, Norwich, Norfolk. NOR54X. Disease at: Pond Buildings, Frans Green, East Tuddenham, Dereham, Norfolk. NORFOLK.
September 8th, 1961. Bernard Mathews Ltd., Gt. Witchingham Hall, Great Witchingham, Norwich, Norfolk. NOR65X. Disease at: Weston Longville Airfield, Norwich, Norfolk. NORFOLK.
September 9th, 1961. A. Cook, 14, Rectory Hall, Rickinghall Superior, Diss, Norfolk. EAST SUFFOLK.
September 9th, 1961. R. E. Palmer, Mill Street, Gislingham, Diss, Norfolk. EAST SUFFOLK.
September 9th, 1961. K. A. Johnston, 51, Queensway, Soham, Ely, Cambs. CAMBRIDGESHIRE.
September 9th, 1961. Mrs. J. R. Barnes, The Bakery, 71, High Street, Meppershall, Shefford, Bedfordshire. Disease at: The Orchard, High Street, Meppershall, Shefford, Bedfordshire. BEDFORDSHIRE.
September 10th, 1961. L. A. C. Buchet, 121, Queensway, Soham, Ely, Cambs. CAMBRIDGESHIRE.
September 10th, 1961. Bernard Mathews Ltd., Great Witchingham Hall, Great Witchingham, Norwich, Norfolk. NOR65X. Disease at Lincoln's Premises, Swannington, Norwich, Norfolk. NORFOLK.
September 10th, 1961. A. E. Chinnery, 1, Stiff Lodge, Wickham Road, Black Notley, Braintree, Essex. ESSEX.
September 11th, 1961. H. Lawrence, 3, Hall Street, Soham, Ely, Cambs. CAMBRIDGESHIRE.
September 11th, 1961. I. A. Hobbs, The Caravan, Ten Bell Lane, Soham, Ely, Cambs. CAMBRIDGESHIRE.

Swine Fever

September 5th, 1961. E. H. G. Trumper (H. C. Trumper & Son), Pant-y-Beiliau, Llanvair, Abergavenny, Mon. MONMOUTHSHIRE.
September 7th, 1961. G. C. P. Baker, The Mill, Scarrington Lane, Aslockton, Nottingham. NOTTINGHAMSHIRE.
September 7th, 1961. S. W. Green, Bradcar Lane Farm, Bradcar Lane, Shropham, Attleborough, Norfolk. NORFOLK.
September 7th, 1961. J. F. Evans, Battle Lodge, Battle, Brecon. BRECKNOCK.
September 7th, 1961. G. Evison, Braffords Farm, Raywell, Skidby, Cottingham, Yorks. YORK, EAST RIDING.
September 7th, 1961. H. E. Jones, Moor Farm, Hartlebury, Kidderminster, Worcs. WORCESTERSHIRE.
September 8th, 1961. T. H. Yarnold, The Grove, Shelsley Kings, Great Witley, Worcester. WORCESTERSHIRE.
September 8th, 1961. A. M. Wilkinson, The Grange, Rainton, Thirsk, Yorks. YORKSHIRE, NORTH RIDING.
September 8th, 1961. T. Harrison, Chatt House Farm, Burton Pidsey, Hull, Yorks. YORKSHIRE, EAST RIDING.
September 8th, 1961. T. Goodyear (Senior), Hill Farm, Moss Pit, Stafford. COUNTY BOROUGH OF STAFFORD.
September 8th, 1961. G. Greaves, Rylands, London Road, Weston-on-Trent, Stafford. Disease at: premises at Hixon Aerodrome, Hixon, Stafford. STAFFORDSHIRE.
September 8th, 1961. Whites (Farmers) Ltd., Manor Farm, Thorpe Salvin, Worksop, Notts. Disease also at: Castle Farm, Thorpe, Salvin, Worksop, Notts. YORKSHIRE, WEST RIDING.
September 8th, 1961. J. C. Wilkinson, The Lines, Sandhutton, Thirsk, Yorks. YORKSHIRE, NORTH RIDING.
September 11th, 1961. H. C. Hart, Blacksmiths Arms P.H., St. Peters Street, St. Albans, Herts. Disease at: Piggery at Field House, West Lane, Essendon, Herts. HERTFORDSHIRE.
September 11th, 1961. H. Evison, Elloughton Hill Farm, Elloughton, Brough, Yorks. Disease at: Elloughton High Hill Farm, Elloughton, Yorks. YORKSHIRE, EAST RIDING.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

The Association of Veterinary Students

Sir,—May I, through the courtesy of your columns, have the opportunity of correcting a misunderstanding that arose at the recent quarterly council meeting of the B.V.A.?

At this meeting it was stated that the students of the Royal Veterinary College were interested in organising a vacation course in poultry husbandry and had approached the British Veterinary Poultry Association with this in mind. This is not true, and in fact, the approach was made on behalf of the Association of Veterinary Students of Great Britain and Ireland following a resolution passed at the A.V.S. Meeting of Representatives in May, 1961. In addition, I should like to emphasise that the primary intention of this course will be to stimulate the interest of our members in the disease and husbandry problems in the poultry industry, and did not arise owing to dissatisfaction with poultry education within the veterinary schools, as was implied at the meeting.

During this meeting it was also stated that the A.V.S. should have negotiated the arrangements for the vacation course through the B.V.A. During the recent Congress in Oxford, I had the opportunity of discussing this matter with the President and the General Secretary of the B.V.A., and I had their assurance that this case is similar to that of a B.V.A. division wishing to organise a refresher course for its members, and that it is not necessary to go through the head office on such occasions. However, we now realise the advisability of seeking guidance on such matters in the future.

Another point which came to light during the council meeting was the fact that our Association is already a cadet branch of the B.V.A., a fact of which we were not aware. This has served to underline the fault of lack of continuity which exists in

the administration of a student association such as ours where the members are so widely dispersed and without a permanent central office. By effecting changes in our constitution and with the help of the B.V.A., we hope to correct this fault in the future.

Yours faithfully,

PETER L. BARDGETT,

President, Association of Veterinary Students.

Liverpool University Veterinary Society,
Chatham Street,
Liverpool.

September 7th, 1961.

Torsion of the Abomasum in a Guernsey Calf

Sir,—In view of the current interest being taken in disorders of the bovine abomasum it is of interest to record the death of a 3-week-old Guernsey calf due to torsion of this organ. This animal had been perfectly well 24 hours previously but when fed that evening had been slightly tympanitic, and failed to consume all its food. It was dead next morning.

Post-mortem examination showed large quantities of haemorrhagic fluid in the peritoneal cavity. The most prominent feature was gross congestion and blackening of the abomasum, which was rotated lengthwise so that the pylorus lay immediately posterior to the liver, and the organ ran posteriorally and dorsally towards its attachment with the rumen. The mucous membrane was black and there were large quantities of gas in the lumen, with a little hay and straw. Considerable oedema was present in some parts of the abomasal wall, particularly around the pylorus, and there were a few scattered clots of fibrin on the peritoneal surface. There was also a small rupture in the wall of the abomasum, but it was not apparent whether this had occurred before or after death. No other abnormalities were observed with the exception of a few haemorrhages on the omasum and the neighbouring portions of the rumen.

This animal was carefully tended in a warm, modern calf-house with individual pens. It was fed a proprietary calf milk substitute, and a little good quality hay; calf nuts were always available. No cause for this condition was apparent.

Yours faithfully,

OLAF SWARBRICK.

The Cricket Field,
Fontwell,
Arundel,
Sussex.

September 9th, 1961.

Hygiene in Slaughterhouses

Sir,—Mr. J. Norval deserves commendation for his interesting article "Hygiene in Slaughterhouses" in your issue of August 12th. His article clearly indicates the need for a comprehensive system of meat inspection in Great Britain under state control. However, I would venture to take issue with him on one paragraph in his conclusions, which reads as follows:—

"I also feel that some research work should be carried out to settle the controversy on whether power sprays are better than wiping cloths for reducing surface contamination, and whether this excess washing has any deleterious effect on the keeping quality of the carcase."

With regard to his first question, he has already answered it in his paragraph headed "Wiping Cloths," in which he states that these cloths are indeed an important source of contamination.

With regard to his second question, power sprays have been used for washing cattle in this country and in Canada for many years without any detelerious effect on the keeping quality of the carcase.

However, if it were the practice in North America to spread colonies of Salmonellae over the outer surfaces of animal carcases with cloths previously contaminated in order to ensure the maximum effect, then I would not be prepared to vouch for the keeping qualities of such carcases. It is plainly evident that research into this subject is unnecessary; the element lacking is public relations rather than research.

If the public in Great Britain were fully informed of the present state of affairs in slaughterhouses, they would insist on the necessary corrective legislation forthwith.

It would appear that the veterinary profession could be very much more active in keeping the public informed in regard to these matters than is the case at present.

Yours faithfully,

J. N. SIMPSON-WHITE.

10504 Walnut Avenue,
South Gate,
California, U.S.A.

September 9th, 1961.

A Flexible Nylon Cannula for Continuous Drip Therapy

Sir,—Recent correspondence on fluid therapy in small animals leaves untouched the techniques of intravenous fluid administration. Contact with a number of practices has shown that, when intravenous fluids are to be given the only means has been *via* an ordinary hypodermic needle. Such a needle is liable to puncture the vein wall and leave the lumen if the animal should move, and hence in the conscious animal it is difficult to use it for continuous drip therapy. It is with these difficulties in mind that I

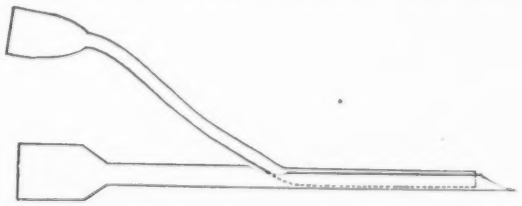


FIG. 1.—McGreggor intravenous needle and cannula.

thought it of value to describe a flexible nylon cannula which is simple to introduce, causes no discomfort to the patient and cannot puncture the wall of the vein whilst in use.

The cannula consists of 0.5 mm. bore nylon tubing with an attached Record or Luer fitting mount. The tubing fits exactly into the lumen of a special introducing needle of 1 mm. external diameter. The

cannula and method of introduction is fully described by McGreggor (1960). (See Fig. 1.) In dogs, introduction of the needle and cannula into the vein is straightforward, even in Pekingese and Dachshunds.

There are a few points worth mentioning, concerning its use in the dog. The length of the cannula should be such that the end does not lie in the region of the elbow joint, assuming that the cephalic vein is used, otherwise when this is flexed the cannula may be occluded. In this practice we have used a cannula of 5 inches in all but the smallest dogs. When purchased the cannulae are 12 inches long and hence they need cutting to the required length. Another point is that the cannula should be inserted right up to the mount, and this should be securely strapped to the limb; if this is not done there is a danger of the cannula kinking or coming out of the vein, especially if the strapping is removed for any reason.

When the drip has finished the cannula can be flushed with saline, plugged, and left until the following day; it can then be used again without difficulty.

Both needles and cannulae can be obtained from Chas. F. Thackaray Ltd., Park Street, Leeds, 1. The needles cost 7s. 6d. and the cannulae 2s. 6d. The needles can be used many times, the cannulae 3 or 4. They can be autoclaved or boiled.

Yours faithfully,
R. L. SPOONER.

81a, Wantage Road,
Wallingford,
Berks.
August 29th, 1961.

Reference

McGREGGOR, J. D. (1960). *Lancet*. **1**. 528.

Penicillin for Eye Conditions

Sir,—A recent article in THE VETERINARY RECORD mentioned the use of intramammary penicillin for an eye condition.

Its use should be avoided in these conditions as it causes pain as can easily be demonstrated in one's own eye.

Yours faithfully,
D. V. SINCLAIR.

Southwoods Hall,
Thirsk,
Yorkshire.
September 9th, 1961.

Dermatitis of the Horse Caused by *Dermatophilus* sp.

Sir,—With reference to the recent article by J. Scarnell in THE VETERINARY RECORD (**73**. 795), I would like to record a similar case of *Dermatophilus* infection in a horse which, due to neglect, was remarkable for the extensiveness of the lesions.

The patient was an aged draught mare, which had been at grass since April; after a short time at grass, the horse was treated with a creosote mixture for what the owner thought to be ringworm. Two heavy draught horses were also in the same field, but neither developed obvious lesions. A dermatomycosis was suspected and confirmed after laboratory examination.

The lesions were worthy of note for the patient, when presented, had been affected for over 4 months and the disease had been allowed to progress unchecked (see Fig. 1).

The initial sites of infection were bilateral on the buttocks, the lesions by now having reached the chronic stage with the skin thickened and inelastic. Acute lesions were present on the croup and withers, there being confluence of keratin scabs forming thick plaques over 6 inches in diameter and $\frac{1}{4}$ inch thick, with some degree of furunculosis due to secondary bacterial infection. Smaller areas at the acute confluent stage were also present in the ventral mid line, near the pubis, inside the ears and on the poll.

FIG. 1.—Widespread *Dermatophilus* infection in a draught mare.

Acute lesions also extended along the flanks, ventral abdomen, legs, neck and face. These were smaller, circumscribed areas $\frac{1}{4}$ inch diameter, where scab formation $\frac{1}{8}$ inch thick resulted in tufting and lifting of the hairs. There was no confluence of lesions in these early infected areas. It would appear that the acute infection followed exacerbation of a chronic form of the disease, after prolonged exposure and neglect.

Treatment after sedation with Promazine HCL (Sparine), involved removal of all crustaceous exudates and loose hair, with brush and Roccal solution. Affected areas were dressed with a calamine lotion, containing benadryl and sulphanilamide powder. The owner was advised to house the patient, dress the lesions every 3 days and to destroy the material that had been brushed from the coat. Although a favourable response followed rapidly, it is too early to give a full report for the patient is still under treatment.

I should like to acknowledge the help given by Mr. A. G. Rae, M.R.C.V.S., of Boroughbridge, with whom the case was seen.

Yours faithfully,
M. W. FOX.

Royal Veterinary College.
August 25th, 1961.